CDF Upgrade Status

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CDF Upgrades

- Silicon Detector
- Calorimeter upgrades
  - Preshower replacement
    - Current Preshower is gas chamber – 4 crossing memory
    - Replacement is scintillator
    - Same technology as endplug
  - EM Timing
    - Provide timing information from EM calorimeter
- Data Acquisition/Trigger Upgrades – to handle 1 kHz
  - TDC replacement
  - Level 2 trigger decision crate
  - Track trigger upgrade
  - Event builder upgrade
  - Level 3 computer upgrade
  - Silicon trigger upgrades

Recent Events

- The most significant event of the past year for the CDF Upgrade programs was the cancellation of the silicon detector upgrade.
- There is now a new baseline for the project
  - Scope of all non-silicon upgrades remains the same.
  - Some elements of the silicon project were retained
    - Items for long term maintenance
  - The silicon work is being “closed out” in a meaningful way
    - “Preproduction” staves (~7%) being assembled and read out
    - Results will be published – interest in the work at BNL, Jeff. Lab

New Baseline

- The rebaselining of the CDF upgrades was approved at the ESAAB on 8 Dec 2003.
- Silicon costs include money spent to date and a few items that were retained.

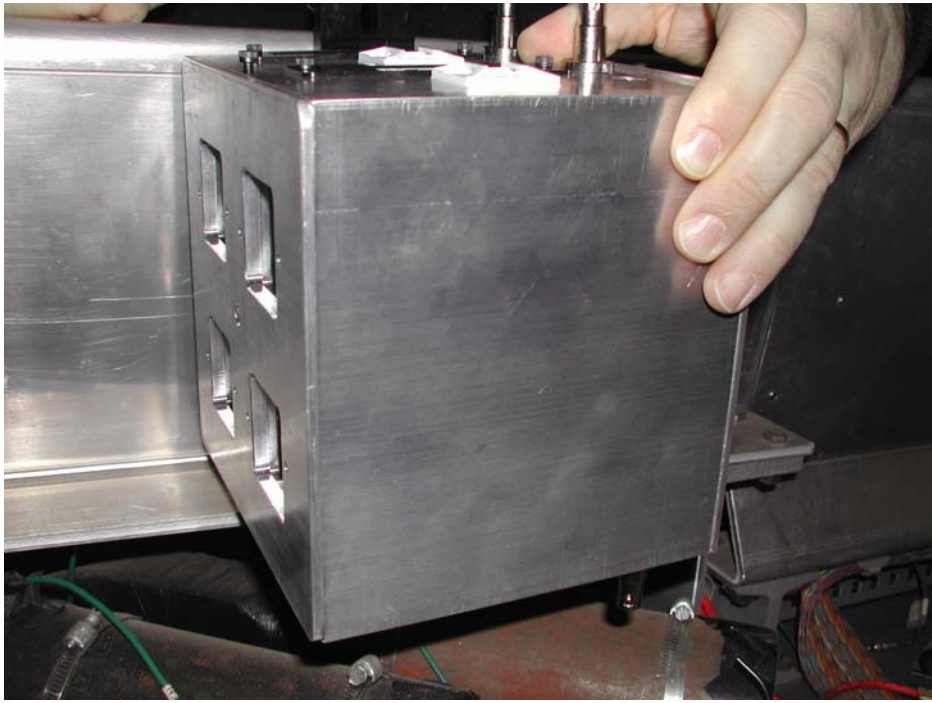
	2002 Baseline ($K)		New Scope ($K)	
	Cost	Cont.	Cost	Cont.
Silicon	$ 12,008	$ 5,145	$ 2,527	$ 396
Calorimeter	$ 342	$ 335	$ 342	$ 335
DAQ	$ 3,788	$ 1,678	$ 3,788	$ 1,678
Admin.	$ 1,285	$ 407	$ 1,006	$ 302
Total	$ 17,422	$ 7,565	$ 7,663	$ 2,711
	24,987		**10375**	

Silicon Upgrades

- Several silicon related subprojects were retained in the rebaseline exercise.
  - Money may be needed to preserve the existing detector longer and with higher occupancy than planned.
- Radiation monitoring, interlock upgrades, DAQ upgrades, and SVT upgrades have budget set aside.
- A Silicon Longevity Committee was created to identify the areas where upgrades/replacements are needed.
  - This will guide our direction here.

Calorimeter Upgrades

- The Preshower project has begun module production
- Parts are ordered and are coming in
  - 700 (of 2600) scintillator tiles this month
  - All phototubes are in hand
  - 4 CPR modules by April, 2 wedges/week afterwards.
- Good chance to be ready for a fall 2004 installation.

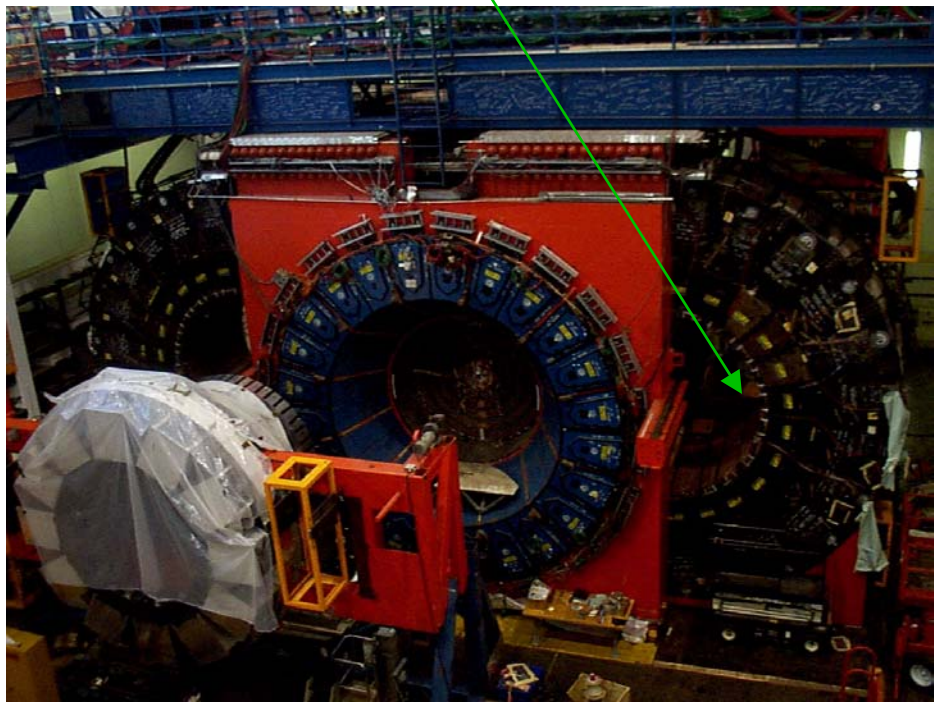


PMT holder

Preshower Installation

- Installation requires the calorimeter arches to be extracted
- Procedures are being developed to do this in the collision hall.
- During last week's access
  - Discussed JHA, installation procedures
  - Finalized scaffold design
  - Tested PMT box installation

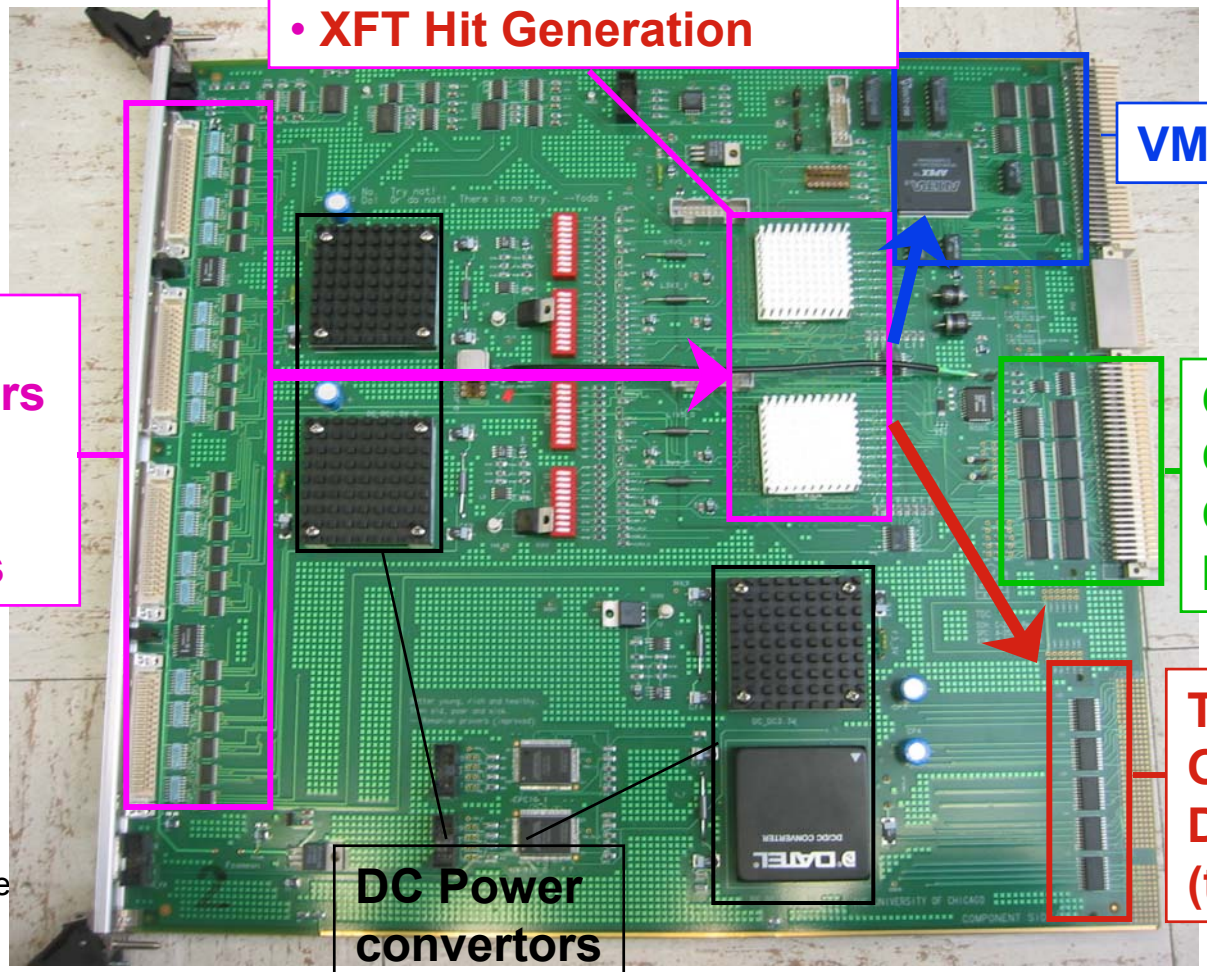
CPR location



TDC Progress

- Prototype TDC released for fabrication in January
  - First board with power distribution and VME interface delivered in February 10
    - No problems found with VME or power
    - Released assembly of 2 fully populated boards
  - Two fully populated boards delivered March 1
    - Complete test of interface to VME
    - Tests of TDC chip functionality
    - Preparing tests of trigger output
- All tests so far are successful (~60% of functionality tested)
  - Few problems solved by modifying firmware

New TDC Board

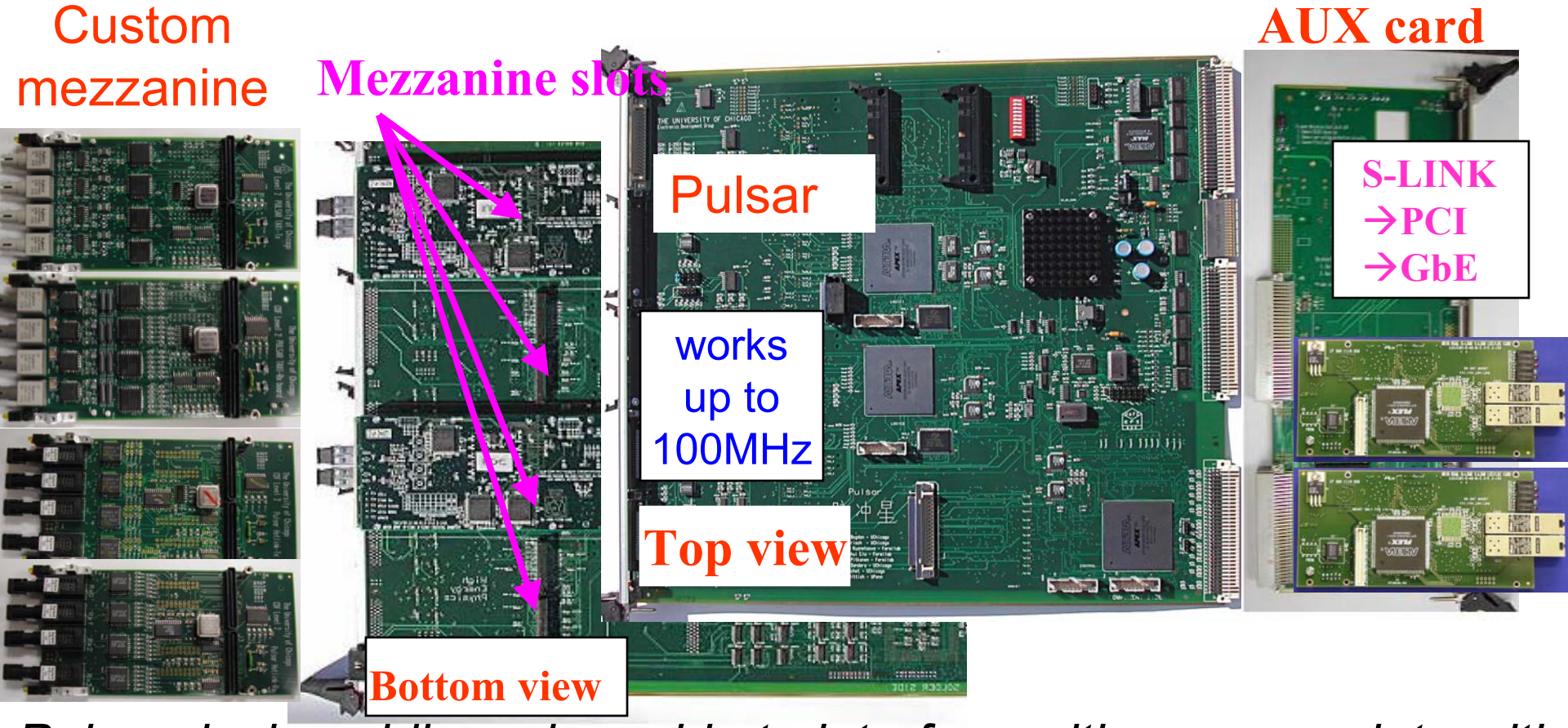


Level 2 Trigger Upgrade

- Level 2 replaces the Alpha based system
- Based on multiple Pulsar boards – PC for algorithms
- Faster, more maintainable than original system
- Production orders placed for the full set of Pulsars
- Commissioning is planned for this summer
  - Each data path should be run by June
  - Full parasitic operation before the shutdown in August.

Pulsar Design

→ modular/universal/self-testable



Pulsar design philosophy: able to interface with any user data with any link format (e.g. S-LINK or GbE) via mezzanine

Many applications within & outside CDF (compatible with Atlas)

Track Trigger Upgrade

- Track Trigger (XFT) design
  - Improves timing resolution at the trigger level
  - Incorporates stereo information at the trigger level
- Recent luminosity increases and COT aging issues have reinforced our need for this upgrade.
  - Also made it difficult, since the manpower is diverted.
- This project is behind schedule
  - The group is still committed to building it.
  - Simulation of our operating conditions is in progress
- We plan a review of the schedule/scope for early May

Event Builder Status

- Originally an upgrade of the ATM switch, new baseline is based on Gigabit ethernet.
- The project is well underway:
  - Final system switch installed on the 3rd floor
    - VME to switch readout: VMIVME-7805
    - GbE switch: Cisco 6509
  - Expertise on board (from both CD and CDF)
  - Working prototype by Aug 2004
- Completion on schedule (Summer 2005) should not be a challenge.

Fall 2004 shutdown

- Our goals for the shutdown (23 Aug. – 5 Dec.) are
  - Complete the EM timing installation
    - Endplug is done, central remains (10% done now, working well)
  - Install as much Preshower system as possible
- At this point, we to do not plan to set the duration of the shutdown
  - Our work will fit in the time available.
- Our schedule for installation activities is ~10 weeks.
  - Maintenance may add more, so the time will be tight

Conclusions

- Calorimeter activity is working hard towards the goal of readiness for a 2004 installation
  - Timing is ready now
    - Hardware is available
    - Commissioning is in progress for portions installed
  - Preshower is confident they can make it.
    - Still many modules to build
    - Installation procedure is not yet fully designed
    - Module production has begun, phototubes are in hand

Conclusions

- TDCs have made progress
  - More people are needed, and a couple are close to joining.
- XFT has a large group, and can probably rally
  - Internal review of this in May.
- Event builder upgrade is probably fine.
- Silicon plans need to be resolved
  - Longevity committee will guide this.